

LOW NOISE X-RAY DETECTOR
FOR FLUOROSCOPY

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ABSTRACT

A flat-panel, quantum-limited x-ray imager for fluoroscopy is configured for converting very low levels of x-rays into electrical signals suitable for standard processing by a computer into real-time images, and comprises a screen for converting x-rays into visible
10 light, a very fast demagnification lens system/array positioned behind the screen and configured to provide quantum-limited performance, and an array of CCD image sensors optically coupled, via the lens system, to the screen. The CCD sensors have a high signal-to-noise ratio and an onboard CCD amplification mechanism in the form of an extended section of "gain" register between the normal serial register and the final detection node or output
15 amplifier. The sensors' sequential, internal electrodes are controlled by way of a clocking scheme that produces a slight and well-controlled avalanche multiplication (a slight gain) at each stage in the gain register.

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